WEEDS and TURF PEST CONTROL

JULY 1963

Monthly news for contract sprayers of weeds, turf, ornamentals, and trees

Update On Ornamental Pest Control

Page W-8

Minute aphids are a species of plant lice which greatly damage some ornamentals and are one of the contract sprayers' biggest headaches. This remarkable photo enlarges the pest immensely; the rose stem shown is not the main one, but a small leaf stem! (Photograph made with 135mm telephoto lens on extension tubes with a 35mm Heiland Pentax H-3 camera.)

Freeman Explains Federal Pesticide Laws W-21

Fla. Turfmen Seek Improved Management . . W-16

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PEST CONTROL

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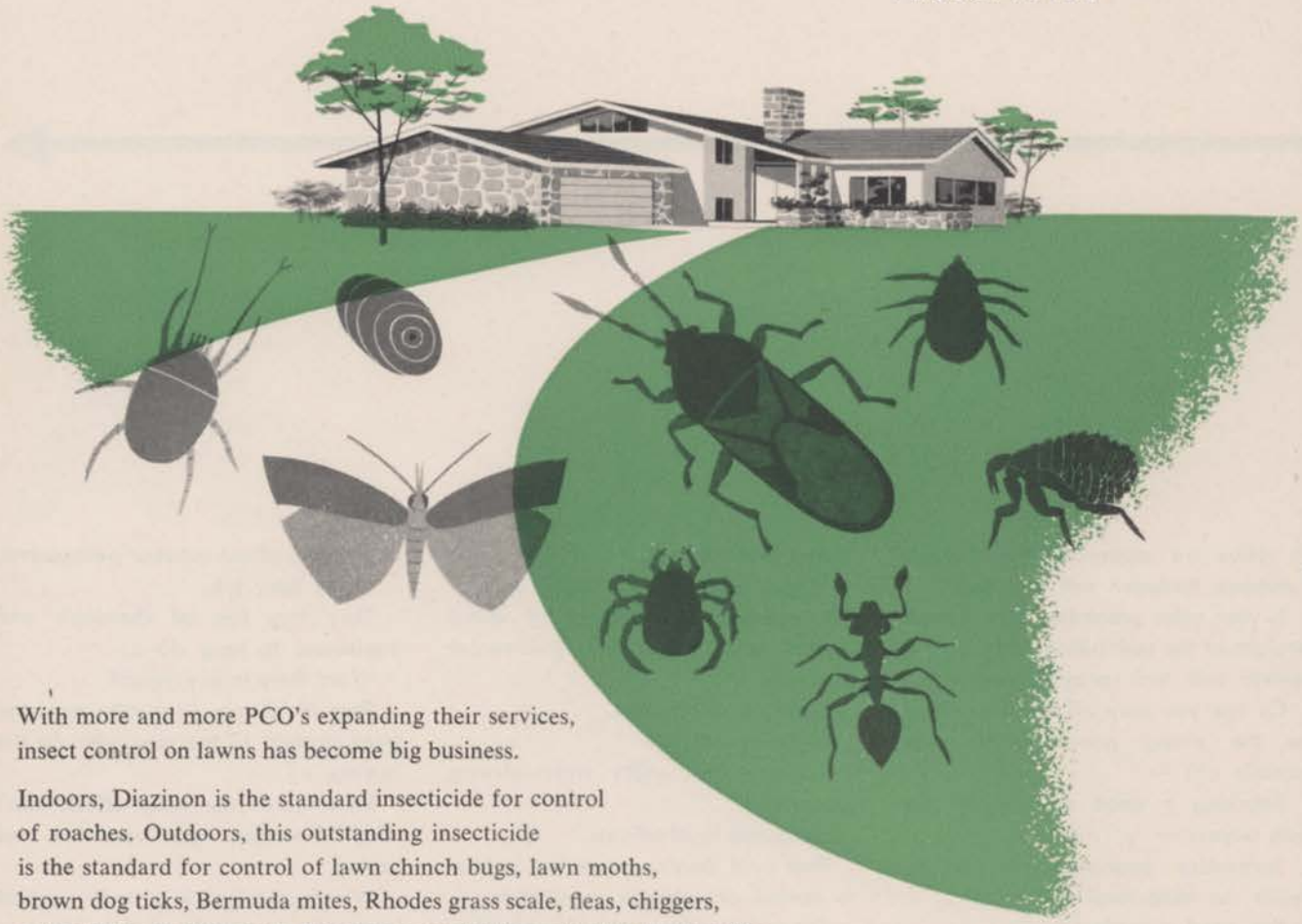

With more and more PCO's expanding their services, insect control on lawns has become big business.

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WEEDS and TURF
PEST CONTROL
A SECTION OF PEST CONTROL MAGAZINE

July, 1963

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The first year

This July issue marks the first anniversary of *Weeds and Turf*, a publication conceived as a service to America's contract applicators.

It would be false modesty to deny how successful the fledgling magazine has been. But it would be equally incorrect if we failed to take note of all the people who've helped spur on this successful year.

Readers have been most generous with their letters, most of which contain very constructive suggestions.

Suppliers have offered their counsel, and have given important support through our advertising pages, which of course make this kind of venture possible.

Researchers from universities, from government agencies, and from manufacturers have written many articles for us (or more accurately, for *you*); these same men have offered technical guidance, and have reviewed manuscripts by our research staff.

In the past year, several original staff-written articles were presented. Approved after many weeks of study, these papers on turf diseases, pre-emergent herbicides, soil sterilants, lawn insects, and the definitive study of the chinch bug, are all examples of the editorial policy which has gained the confidence of the 10,000 who receive *W&T* each month.

In the coming year, more of such articles are planned, along with features on legislation, business management, advertising, equipment maintenance, and dozens of technical articles on turf, trees, and weeds.

The widely praised weed identification box will be continued.

We hope that these future issues will find the same hearty welcome that marked last year. We'll be glad to get any suggestions about the content of *Weeds and Turf* as it heads for its *second* anniversary.

In the meantime, we want to say a sincere thank you to our readers, our advertisers, and to our authors for making the first year a success.

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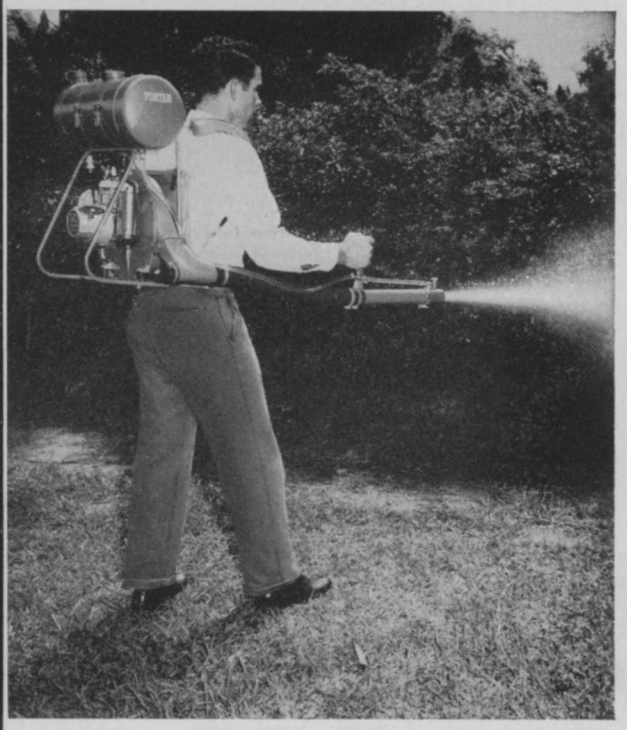

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These white pine trees have been completely defoliated by bagworms, a common leaf-feeding pest of many trees and shrubs.

How To Control Pests of Ornamentals

By DR. DONALD L. SCHUDER

Associate Professor, Department of Entomology
Purdue University, Lafayette, Ind.

THE PRESENT trend of the American people for suburban living has opened a new field of service, that of insect control of lawns and ornamental plantings.

Several pest control firms in the East and Midwest are already established in this field, and are finding it an excellent source of income in association with their normal household pest control operations. Other companies should investigate the possibilities of expanding into this line of work, while the demand is still growing and there is room for more operators.

Before going into this new business, PCOs and CAs should give some thought to the potential in their areas and the ability of each firm and its employees to take on this new line of endeavor. A change would necessitate knowledge of a new group of insects, new and often larger equipment, and new methods of operations. Most of the actual work is done during the spring and summer months, which are already the busy season for the PCO. Many of the firms in this business have trained personnel who specialize in the care of lawns and ornamental plantings.

In order to understand the scope of this business and the possibilities of success in it, the operators should understand the insects and plants involved, insecticides and equipment needed, and numerous other problems. This article briefly summarizes some of the pests, and lists methods for their control. The topic is divided into *Sucking Insects, Chewing Insects, Tree Boring Insects, Leafminers, Galls,* and *Mites.*

Sucking Insects

This group includes the various aphids, lacebugs, plant bugs, and leafhoppers which weaken plants by sucking out the plant sap. These insects frequently inject into the plant tissues secretions which injure or kill the plant cells.

Aphids or *Plant Lice* — Nearly all ornamental trees and shrubs are subject to injury by aphids. These insects are small, soft-bodied insects which may vary in color from green to shades of red, brown, or black. The insects may attack both aerial and subterranean portions of the plant, but are commonly seen clustered on the new growth or the underside of leaves. When the population of aphids is heavy, they may cause the twigs and leaves to become curled and twisted, flower buds hardened, and flowers malformed. Aphids secrete a sweet, sticky substance called "honey-dew." The material is attractive to ants and flies and is a nuisance on cars, chairs, tables, and the like which are beneath infested plants. A black, sooty mold may grow on the honey-dew.

Aphids may be controlled during the summertime by applying nicotine sulphate and soap, lindane, malathion, thiodan, or diazinon. The highly poisonous parathion and tetraethyl pyrophosphate (TEPP) are also highly effective against aphids, but are not recommended for use by anyone unfamiliar with handling them. Lindane or BHC is preferred for wooly aphids.

A forceful stream of water from

Last December, *Weeds and Turf* presented its first article on ornamental pest control, written by Dr. L. C. Kuitert of the University of Florida. This article by midwesterner Schuder gives another slant on the important ornamentals market, and offers more control hints for successful contract applicators.

the hose will help to remove sticky honey-dew from plants. Since ants frequently are involved in transporting and tending aphids, it is sometimes helpful to kill the ant colony by treating their nesting areas with chlordane.

Lacebugs — Many trees and shrubs are attacked by species of lacebugs. The insects are about ⅛ inch in length, dark in color, with transparent, lacy wings. Both the adults and nymphs feed on the underside of leaves. They extract so much plant juice that the leaves become pale and mottled with white splotches. The lower surface of the leaves are spotted with black and brownish dots.

About the last of May, apply lindane, malathion, DDT, or nicotine sulfate. The new systemic insecticide, dimethoate, is also effective. Be sure to treat the underneath side of the leaves. DDT may induce a mite problem and should be combined with a good miticide.

Leafhoppers — Leafhoppers are small, wedge-shaped, active insects which run, hop, or fly when disturbed. These sucking insects are usually yellow or greenish in color, while a few kinds are striped. Leafhoppers feed on the underside of the leaves, causing them to become light in color and marked with small, white dots on the upper surface. Often, the cast skins of the nymphs remain attached to the lower surface of the leaf and may serve as an aid in identifying the cause of the injury. Some species of leafhoppers are known to transmit tree diseases such as phloem necrosis on elm.

For control, apply DDT about the middle of June, or whenever the insects are discovered. Be sure to direct the spray to the underside of the foliage where the leafhoppers feed.

Plant bugs — These small, shield-shaped insects are active and run or fly freely when disturbed. Both the adult and nymphal stages have sucking mouthparts. Several species of this group inject toxins into the plant, causing the parts attacked to wither and die. Terminal buds, shoots, and blossoms are commonly affected.

DDT is the best insecticide for controlling plant bugs. The best

Dr. Donald L. Schuder, assistant professor of entomology at Purdue University, Lafayette, Ind., details the role CAs and PCOs can play in treating for pests of ornamentals.

results are usually obtained by spraying early in the morning, because the insects are less active at that time. Preventive measures are important, and include the removal of weeds, trash, and debris.

Scale Insects — Scale insects are serious pests of many ornamental plants, but unlike the other insects which suck sap from the plants, they are inactive during most of their lives. Scale insects are quite small, usually dark in color so that they are difficult to detect. Infested plants appear unhealthy, grow poorly, and the foliage may be small and chlorotic. For ease in identification, scale insects may be grouped into three divisions: (1) armored scales, (2) soft or unarmored scales, and (3) the mealybugs.

Armored Scales

Armored scales are the most common type of scale insect found on trees and shrubs. They secrete a hard, waxy covering over their bodies. The insect feeds and grows beneath this protective covering or scale. The scale may be circular, oblong, or pear-shaped. The armored scales are quite small, varying in size from ½ to ⅛ inch in length or diameter. A typical life cycle may be illustrated with the gray race of the oystershell scale. These insects overwinter in the egg stage, beneath the female scale of the previous season. These eggs hatch the latter part of May or the first of June. The young scale, called a nymph or crawler, moves about over the host plant until it finds a suitable place to feed. It then inserts its needle-like mouthparts and draws its liquid food supply from the phloem tissues of the plant. At this time, the insect loses its mobility and goes through a series of five molts, casting off its skin before it reaches maximum size and sexual maturity. The males emerge as winged adults and fly about in search of the females. Eggs are laid underneath the female scale and the cycle is repeated the following season. Other species of scales have multiple generations and the cycle just described may be repeated several times each year. In some species, no males are known and reproduction is parthenogenic.

Species having one generation a year can be controlled by sprays in early June. This group includes Putnam scale, pit-making scale of sweet gum, scurfy scale, and the gray race of oystershell scale.

Species having two generations per year can be controlled by sprays in early June and again in late July. This group includes such common species as the brown race of oystershell scale, pine needle scale, and the juniper scale.

Multiple generation species frequently require sprays at monthly intervals for adequate control. Some of the species included in this group are the San Jose scale, euonymus scale, and the tea scale.

Unarmored Scales

Soft, unarmored, or lecanium scales differ from the armored scales and have their waxy secretion as an integral part of their body. The body shape may be flattened, slightly convex, or hemispherical. They are larger than the armored scales, varying from 1/12 to 1/2 inch in length. The eggs are laid beneath the female's body and hatch in one to three weeks. Development is slow and may require almost a year for a single generation. The nymphs of several of the soft scales feed on the leaves during the summer and move back to the twigs in the fall. Most species produce honey-dew.

Some of the unarmored scale species require spraying in June. This group includes: Terrapin scale, hickory lecanium, cottony maple scale, Fletcher's or the taxus lecanium, European elm scale, European fruit lecanium, and

spruce bud scale, among others.

Some of the other unarmored scale insects require spray applications in mid-August. Some common examples are the tulip tree scale, magnolia scale, and oak kermes.

Mealybugs

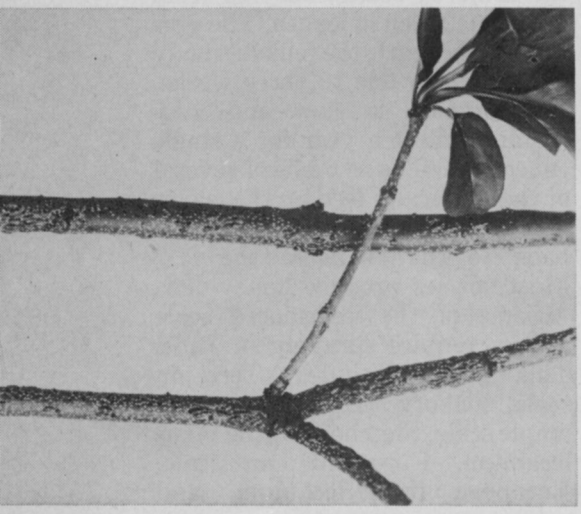
The mealybugs are soft-bodied insects and usually are covered with a powdery, cottony-waxy material. Unlike the scale insects already discussed, the mealybugs have legs and are able to move about throughout their entire life. They vary in size from about 1/5 to 1/3 inch in length when full-grown. The female mealybug deposits her eggs in a white, cottony sack. The species noticed on ornamental trees and shrubs produce two or more generations each year. Some common mealybugs are the grape or taxus mealybug and the juniper mealybug.

Control of Scale Insects

The control of scale insects is often difficult because of failure to obtain adequate spray coverage. To be effective, the spray material must come in contact with the insects. Care should be taken to see that the spray is evenly applied to all parts of the plant. The addition of a wetting agent to the spray mix will help wet the insect and insure penetration of the insecticide through the insect's protective covering.

Scale insects may be controlled during both the dormant period and the growing season. During the dormant period, apply dormant oil, lime sulfur, or the dinitro compounds. When the scale insects occur on oil-susceptible plants, use superior or summer oils. DN and liquid lime sulfur will discolor paint and stone and should be used with caution around home plantings.

Oystershell scales have infested these apple-tree twigs. Large insects are the mature females, while the smaller ones are the young, newly settled crawlers.



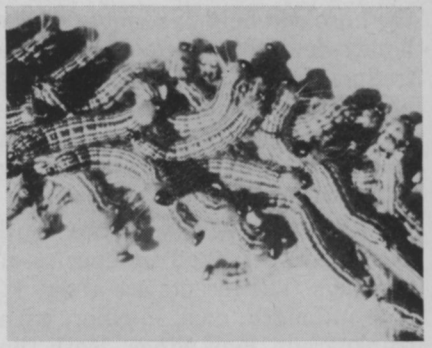
Summer crawler sprays should be timed to coincide with egg-hatch. The most commonly available and effective material for summer application is malathion. The insecticide Sevin has been found to be very effective against many of the lecanium scales. Other insecticides which have been shown to be effective against the scale crawlers are Ethion, Trithion, phosphamidon, Guthion, demeton, phorate, diazinon, chlorthion, and Cygon.

Chewing or Leaf-Feeding Insects

Leaf feeding or chewing insects include those species which consume solid foliage tissue. Members of this group may skeletonize the foliage or entirely defoliate the plant.

The Bagworm — The bagworm is a general feeder and may be found attacking the foliage of both deciduous and evergreen trees and shrubs. The bagworm is so named because the caterpillar spends its life inside a silken, spindle-shaped bag. The bag is usually adorned with bits of twigs and leaves from the host plant and looks so much like a part of the tree that it usually goes unnoticed until extensive damage has been done. The bagworm overwinters in the egg stage inside the old bag. The eggs hatch in late May and early June. The young caterpillars immediately spin bags and continue to enlarge them as they grow. When the bagworm larvae mature in late August and early September, the bags are about 2 inches long. The bags are then attached firmly to twigs or branches and the worms pupate and change into adults. There is only one generation each year.

For bagworm control when only a few small trees are involved, bagworms can be controlled by hand-picking the bags and burning them. This may be done at anytime when the bags are discovered, but is most easily done during the fall and winter, or early spring. Spraying is the most effective method when the trees are large or numerous. The sprays are most effective when applied in early June, as soon as possible after the eggs hatch. Several insecticides are effective. Malathion is the most widely accepted material. Other materials which have been recommended include diazinon, toxaphene, and lead arsenate. The new insecticide DDVP is suggested for trial by professional spraymen.

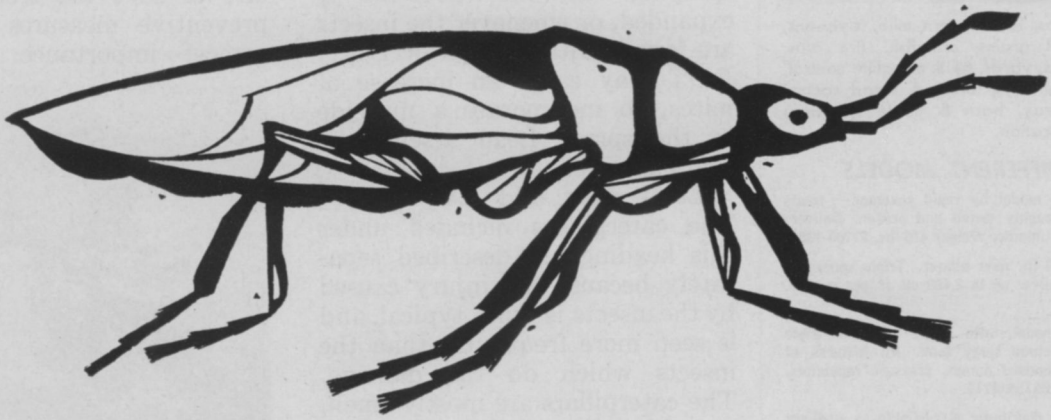


Yellow-necked caterpillars, which usually feed in colonies on pin oaks, will throw back their heads and curl up the tip of the abdomen as a protective action when they are disturbed.

Blister Beetles — Blister beetles are active, black, gray, or striped insects which appear suddenly in enormous numbers and strip the foliage from some species of ornamental trees and vines. The beetles are long, cylindrical, and have an unusual appearance because of their long legs. This group of insects usually appears in large numbers during the summer. They are difficult to control. The best control has been obtained by applying 5% granular dieldrin to the soil beneath the trees or vines. The insects are killed when they return to the soil in the cooler parts of the evening and night. Sprays or dusts of cryolite, chlordane, and DDT have also been suggested.

Leaf-feeding Caterpillars — Caterpillars, the immature stage of butterflies and moths, exist in a wide variety of sizes and colors. Some may be covered with hairs and spines, while others are entirely naked. They may feed singly or in large colonies. All species have voracious appetites and consume large quantities of foliage. Most species are easily controlled with DDT sprays. In the case of some of the webworms, it is essential to use high pressure, so that the foliage inside of the web is covered with the insecticide.

Leaf Beetles — "Leaf beetles" is a term applied to several species



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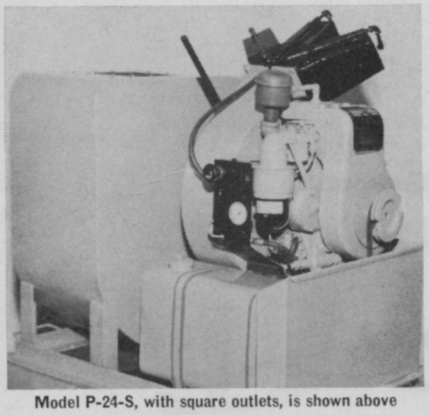

Model P-24-S, with square outlets, is shown above

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of hard-shelled beetles of many sizes and colors which feed upon the foliage of shade trees and shrubs. They may eat holes in the leaves, as in the case of flea beetles, or they may devour the foliage completely. Some common examples are the elm leaf beetle and the willow-poplar leaf beetle. Leaf beetles may be controlled by spraying when the leaves are ¾ expanded, or whenever the insects are found, with dieldrin or DDT. DDT may cause an increase of mites, so incorporate a miticide in the spray. Lead arsenate is also effective.

Leaf-rollers and *Leaf-tyers* — The caterpillars included under this heading are described separately because the injury caused by the insects is quite typical, and is seen more frequently than the insects which do the damage. The caterpillars are mostly small, greenish-yellow, and about ¾ inch in length when mature. These larvae feed in concealment which they provide for themselves by rolling, folding, or tying leaves together. Control of this group of insects involves early application of the insecticide before the larvae have completed their shelters. The most commonly recommended control is TDE. Arsenical sprays are also of considerable merit. Other newer insecticides which have shown promise in leaf-roller control include Endrin, Phosdrin, Trithion, Sevin, and Guthion.

Sawflies — Many shade and ornamental trees are attacked by colonies of caterpillar-like larvae which strip the plant of its foliage. The larvae have five pairs of prolegs and the adults have transparent wings and a sawlike ovipositor, hence the name. Some species are called slugs, because they superficially resemble small, naked snails. The latter group skeletonize the foliage by eating off the lower surface of the leaf. Sawflies are easily controlled with applications of DDT.

Borers and Boring Insects

The larval stage of some beetles and moths are called borers. Some of these insects work in the terminal shoots, while others work beneath the bark, frequently girdling and killing the tree; still others tunnel in the heartwood, which makes the tree subject to rots and windthrow. A few species of boring insects are capable of attacking healthy trees, but the majority attack trees and shrubs only after they have been weakened or injured from some other cause, such as transplant shock, drouth, flooding, and dirt fill over the roots. The presence of borers is often not evident until it is too late to save the tree; therefore, preventive measures are of the utmost importance. Spray the

Fall webworm, a common pest of white oaks and other shade and forest trees, is responsible for the heavy webbing on this forest tree.

trunk of transplanted trees with dieldrin, DDT, or lindane prior to wrapping. Be sure to use wettable powder formulations, since oil formulations may injure the bark when the trees are wrapped. Wrap the trunk of the tree with commercial borer wrap, burlap, or even with aluminum foil.

The beetles which act as borers are classified into three groups:

1. *Flat-headed borers* — the sun-loving, metallic-colored wood borers of the family Buprestidae, the larvae of which work in the cambium region.
2. *Round-headed borers* — the long-horned beetles of the family Cerambycidae, the larvae of which bore into solid wood.
3. *The bark beetles* — the shot hole borers of the family Scolytidae and others. The larvae and adults work in the cambium region and are attracted to weakened trees.

The larvae of some of the

common moths also infest the trunk and larger branches of trees. Common examples are the carpenter worm, leopard moth, peach tree borer, and dogwood borer.

Borers may be killed by spraying before the young larvae hatch from the eggs on the bark. The sprays should be applied at monthly intervals during May, June, and July. Direct this spray at the trunk and larger branches. Materials which have been found effective are dieldrin, DDT, lindane, and BHC.

Borer larvae in the cambium beneath the bark may be cut out with a sharp knife. The exposed wood should then be treated with a good wound paint.

Borers in the wood can sometimes be killed if the tunnel is first cleaned out with a piece of wire, and then nicotine sulfate, malathion, or carbon disulfide is injected into the hole. The hole should be sealed with mud, putty, or caulking compound after injection, to confine the fumes.

Leafminers

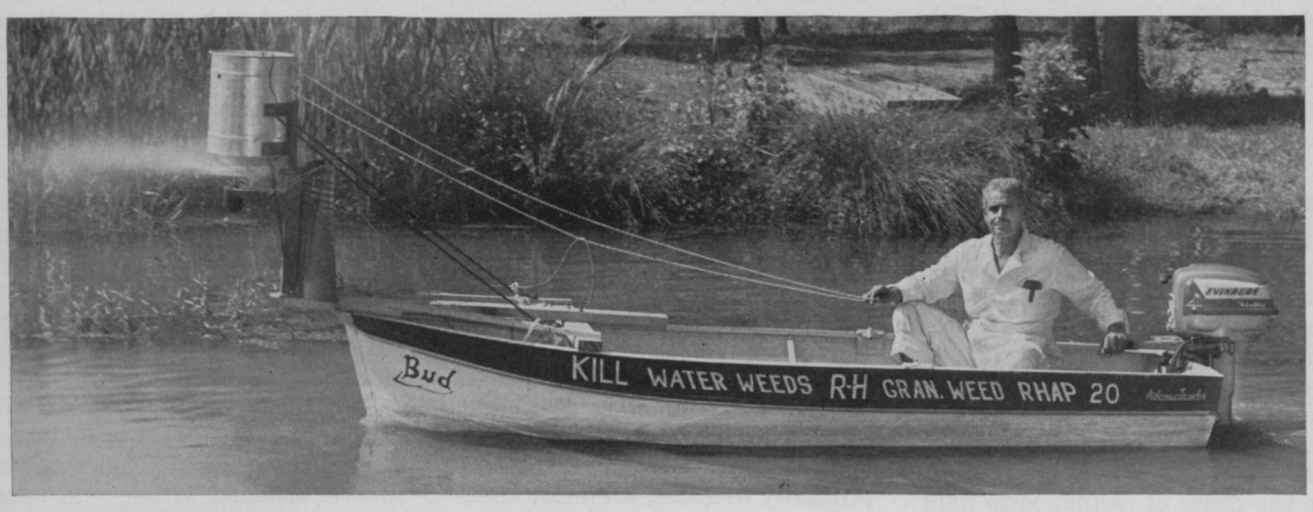
The category of leafminers contains many different kinds of insects, the larvae of which feed between the upper and lower leaf surfaces. This feeding may take the form of tunnels which may be either straight, serpentine, or blotch. Some of the more common leafminers are the holly leafminer, arbor vitae leafminer, boxwood leafminer, birch leafminer, locust leafminer, hawthorn leafminer, and the gregarious oak leafminer.

The control of leafminers depends largely upon proper timing of the insecticidal application. If the insecticide is not present on the foliage before the adults lay their eggs, the larvae already inside the leaves may not be killed. The first applications should be made early in May and repeated at monthly intervals for the species which have more than one generation per year. Insecticides commonly suggested for the control of leafminers are DDT, dieldrin, and lindane. Other insecticides which show promise in the control of leafminers are Ethion, Trithion, Cygon, Endothion, malathion, phosphamidon, and Dibrom. Some of the systemic insecticides, such as phorate and Cygon, have given long-lasting effects when applied to the soil in mid-April. Use a 5% granular formulation at 1 ounce of actual insecticide per inch of trunk diameter at chest height, or apply one pound of actual toxicant per acre.

Galls

Galls are abnormal growths on leaves or petioles induced by insect attack. The forms of galls vary from the simple to the grotesque and unusual. Each species of insect produces a typical gall formation. Galls are produced by various insects, such as midges, wasps, and aphids. Several different mites also produce galls, of which the hackberry witches' broom and the maple bladder gall are common examples. Oak and hickory tre s are the favorite hosts for several hundred different gall insects.

Damage from galls is rarely serious enough to justify chemical control, and since the gall tissue protects the insect inside, sprays applied after the galls have developed are ineffective. When only a few galls occur, they may be



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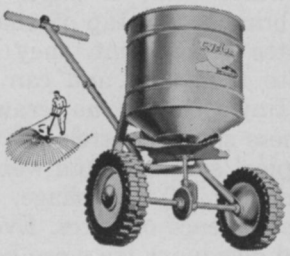

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pruned off and destroyed by burning.

Individual trees which have been heavily attacked by galls in previous seasons may be protected by preventive sprays applied early in the season. Dormant sprays of liquid lime sulfur are effective in preventing attack by Cooley's spruce gall, the eastern spruce gall aphid, ash flower gall, and the maple bladder gall. Where staining by lime sulfur makes its use impractical, delayed dormant sprays (applied just as the buds are swelling) of malathion are equally effective. Similar sprays of malathion and lindane are effective in preventing hickory pouch galls. Several galls, such as the hackberry nipple gall, vein pocket gall, the marginal fold gall of pin oak, honey-locust pod gall, and the gouty oak gall have been successfully prevented by applications of insecticides when leaves are about ¾ expanded. The insecticides showing the best results have been dieldrin, Sevin, malathion, lindane, and DDT. Treating the soil beneath infested trees in early spring and in the fall with the above materials is helpful. The aerial and subterranean galls of woolly apple aphids on crabapples have been prevented by monthly application of phorate and demeton. Apply the sprays to the soil, trunk, and foliage.

This pin oak tree has been heavily infested with the marginal fold and pocket galls. Note how the foliage has been twisted and distorted by the infestations.

Mites

Mites are not insects, but are tiny animals closely related to spiders and ticks. They are sometimes called "spider mites" because they spin silken threads over the host plant. Most mites are so small that they can barely be seen with the naked eye. The best way to be sure that mites are the cause of trouble is to hold a white sheet of paper beneath a branch and tap it sharply. If mites are present, they will fall onto the paper and can be seen as tiny specks as they crawl about. These specks, correlated with the typical speckling and webbing, or bronzing, of the foliage, indicate the presence of mites. Evergreens and deciduous trees are both subject to mite attack. Some of the mite species commonly associated with ornamental plants include the two-spotted mite or red spider, the spruce mite, the European red mite, the honey-locust mite, and privet mite. Any plants sprayed with DDT should be closely watched for mites, since these pests are not killed by DDT but many of their natural enemies are. It is always wise to include a miticide with DDT sprays to prevent mite buildup.

During the past 15 years, a number of new chemicals have been developed for control of mites. These materials, called miticides, do not have any effect on insects. Some insecticides, such as Cygon, phorate, malathion, and parathion, are effective against both mites and insects. Most miticides should be reapplied at periodic intervals throughout the summer.

Some of the newer, more effective miticides include Kelthane, Dimite, Chlorobenzilate, Eradex, and Aramite. Tedion and Ovotran, primarily ovicides, are most effective when applied before mite populations become abundant.

This discussion will probably make many CAs and PCOs hesitate to tackle the job of controlling insect pests for their customers because it might appear as though there are too many insect pests with which they would have to become acquainted. However, many operators are already very well acquainted with several of these pests. For example, many already control the boxelder bug, the elm leaf beetle, and the hackberry psyllid when these insects leave their plant hosts and invade homes in the fall of the year. Actually, these insects are easiest to control by attacking the insects while they are still on the host plant; therefore, many PCOs have already entered the field of ornamental insect control. Since pest control operators have found this endeavor profitable, it is only logical to help the customer by controlling their other ornamental insect pests while the equipment and materials are at the scene.

Successful control of insect pests depends upon thorough coverage, whether they are indoors or out-of-doors on trees and shrubs. In order to get adequate coverage out-of-doors, the small one- and two-gallon sprayers, commonly used by the PCO servicemen, will have to be replaced with larger power equipment. The type of sprayer selected will depend upon the extent to which one is going to engage in the care of trees and shrubs. Small trees, 35 feet in height, may be adequately covered with some of the small sprayers used in termite work; however, tall trees such as the American elm, oaks, etc., require hydraulic rigs, or even the new air blast sprayers and mist blowers.

When sprays are applied to a wide variety of plant materials under varied conditions, plant injury is always a hazard. Two plant sensitivities are worthy of

particular attention at this time. Cannaert junipers are browned by applications of malathion, and DDT sprays will defoliage Amur river privet. A compilation of known phytotoxicities was published in *Pest Control* magazine in June 1960, and should be consulted for more specific details.

Those investigating the possibilities of entering the field of ornamental insect control should be interested in selected references. The four references listed below will provide the basic information needed to provide ornamental insect pest control services for customers' outdoor problems.

Suggested References

Anonymous. 1956. Lawn Insects, How to Control Them. USDA Home and Garden Bulletin No. 35. Superintendent of Documents, Washington, D.C.

English, L. L. 1956. Illinois Trees and Shrubs: Their Insect Enemies. Illinois Natural History Survey Circular 47.

Schuder, D. L. 1962. Insect Pests of Trees and Shrubs. Purdue University Mimeo E-41.

Westcott, Cynthia. 1956. The Gardener's Bug Book. Doubleday and Company, Inc., Garden City, N. Y.

Be Cautious Near Power Lines

"CAs must learn to live with the hazards of electricity," John M. Ferguson, extension agricultural engineer at Kansas State University, Manhattan, points out. "Just using good judgment and not taking any chances will help."

Pruning, spraying, and moving large equipment near high-tension lines were cited by Ferguson as possible dangers for CAs who do power line or substation weed control work.

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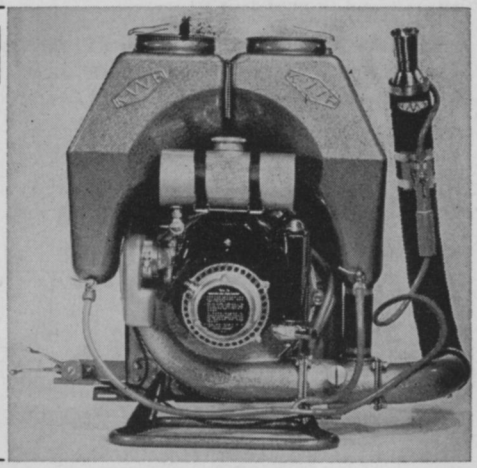

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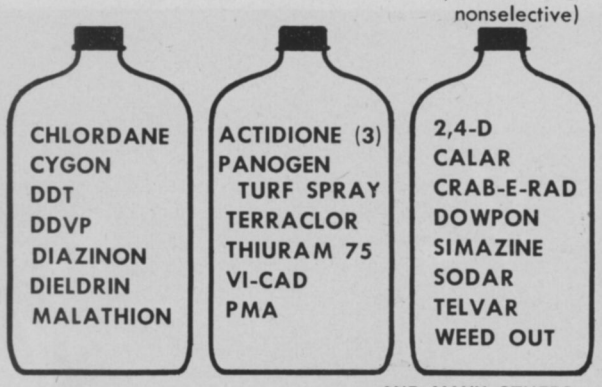

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Improved Management Techniques Stressed at 2nd Fla. Turf Show

By WALTER D. ANDERSON

Executive Secretary, Florida Turf-Grass Assn., Jacksonville, Fla.

While a threatened downpour of badly needed rain held off, the Second Annual Florida Turf-Grass Trade Show, May 2-4, got off to a succcessful start.

Nearly 300 registrants participated in various phases of the show, held at the University of Florida Experimental Station Plantation Field Laboratory in Fort Lauderdale, and at the Seville Hotel on Miami Beach. Florida Turf-Grass Association members from as far away as Puerto Rico, Texas, Virginia, and New York flew in especially for the show, which grew appreciably in attendance and number of exhibits over the successful First Annual Show held in 1962.

More than 200 CAs began with a field day and demonstration at the Plantation Laboratory, and followed Dr. Evert O. Burt, assistant turf technologist, on a tour of the turf research being conducted there. Guided tours were conducted over the research plots and areas during the morning, while registration was continuing.

Demonstrations of turf equipment followed a barbecue prepared by Bob Pryor, Broward County Agent, and lasted through the afternoon.

A complete range of equipment used in the turf industry, from the largest down through the smallest was shown: tractors, mowers, and fork lifts to fertilizer spreaders and small mowers. As the demonstrations ended—and the rains began—the spraymen headed to the Seville Hotel in Miami Beach for the next two days' sessions, which included a business clinic and the opening of the exhibits.

Business clinic on Friday morning featured Drs. A. J. Noetzel, Dean Emeritus of the School of Business Administration of the University of Miami, Coral Gables, Fla., J. Everett Royer, chairman of the University's accounting department; and Curtis Millen, of Florida Advertising, Inc., Fort Lauderdale.

Aim of the clinic was to assist registrants, most of whom are small businessmen, with the latest thinking and services available to them.

Dr. Noetzel began by noting that in 1962 more than 15,000 small businesses failed and 100,000 others were on a shaky footing due "primarily to management inadequacy." This inadequacy, he indicated, was shown in four basic areas:

1. *Lack of insurance*: Many small businesses fail to take advantage of insurance against risks such as fire, theft, etc. He stressed the need for a well-rounded insurance program, covering not only these areas, but also workmen's compensation, insurance for the executives and employees, and hospitalization programs.

2. *Debt mismanagement*: Many businesses fail to consider a consolidation of their entire listing of debt accounts, to take advantage of lower, minimal interest rates. Consideration should be given by all small firms to the consolidation of all of their debts into one package.

3. *Lack of account analysis*: Need is obvious, Dr. Noetzel said, for a continuing study of all accounts, so that the financial picture of the firm is clear at all times, and it is apparent which accounts are not profitable and should be discontinued.

4. *Failure to make lease arrangements*: Outlining the advantages and disadvantages of leasing arrangements not only for buildings, but also for storage space, equipment, etc., Dr. Noetzel stressed that in many cases lease arrangements could be far more profitable than outright purchase of the facility or equipment.

A detailed review of simplified accounting procedures was presented by Dr. Royer, who discussed accounting forms available for the use of the small businessman. "Many of these could be put into use as a tool for better management," he recommended.

Stressing that the simplest accounting system possible that does the job is the best one, Dr. Royer urged the weed and turf businessmen to take advantage of consultive services offered free by office equipment firms to set up the necessary business systems. Underlining Dr. Noetzel's remarks, he emphasized the need for a

Jubilant officers of the Fla. Turf-Grass Assn. commend each other on their successful Trade Show. Left to right are James L. Blackridge, secretary-treasurer; Ralph White, Jr., president; and Dr. Gene C. Nutter, vice president.

Saturday's Clinic was open to the public, and more than 300 people came in to look at exhibits and question turf experts on the panels, which rotated members for six hours. Dr. Evert O. Burt (right), prepares to answer a query about a lawn blight, after examining a piece of turf brought in by a homeowner. General show chairman James E. Ousley, Sr., looks on. Both Ousley and Dr. Burt were among the turf specialists who filled in on the panels for a while.

Veteran sprayman Charlie P. Johnson, of Charlie P. Johnson Spray Co., Inc., Miami, a familiar figure whenever CAs get together, gives a disease's diagnosis to a questioning homeowner, as Dr. Evert O. Burt and Dr. Gene C. Nutter wait for additional questions from the curious crowd.

continuing cost analysis of the entire business operation, and pointed out that one of the biggest items of business operation often overlooked is the overhead costs. "This is where most businesses fail to properly assess their production costs."

Speaking about advertising and its application and use to the small businessman, Curtis Millen suggested that there were six approaches to follow in setting up an advertising campaign:

1. Is this for an immediate effect or a long range program?
2. Is it sensibly planned from financial and timing aspects?
3. Is it carefully budgeted to take advantage of the best rates for desired accomplishments?
4. Is it designed to find and reach the potential customer?
5. Does it keep the name of the firm and the product constantly before the public?
6. Is it good, responsive advertising that does not get off base?

"By studying advertising done by many types of businesses represented in the turf industry, we've found that these businesses often have a great need for information and education," Millen revealed. "This would lead to a general upgrading of their advertising approach to potential customers."

With the number of capable men involved in turf, Millen said, a good, solid advertising program could help upgrade not only their own individual businesses, but the entire turf industry as well. Agreeing with Dr. Royer, he also suggested that consultation services of advertising agencies be used.

After the business clinic was over, the Exhibit Hall, with exhibits in 56 booths, was opened. As in the field demonstrations, exhibits contained the whole spectrum of turf supplies.

Evening program on May 3 consisted of an informal reception, dinner, and dance, with much time spent in table-hopping, conversation, and relaxation.

Exhibits were open to the general public as well as registrants on Saturday. More than 300 people toured the hall and participated in the rotating lawn clinic, which lasted for six hours and featured a constantly changing panel of experts from every segment of industry, plus the University of Florida and the Florida Experiment Stations and Extension Services. Homeowners asked questions on every subject of lawn care, maintenance, growth, diseases, and insects, and a few even brought in patches of turf from their lawns to learn the solution to their problems.

At the conclusion of the lawn clinic, which ended the Second Annual Trade Show, both the contract applicators and members of the public who were present were enthusiastic about this session, and plans are being made to open this part of the Trade Show to the public again next year.

One of the nearly 300 contract applicators who registered for the Second Annual Florida Turf-Grass Assn. Trade Show was Walter Ferguson, president of the Florida Horticultural Spraymen's Assn., whose group meets later this year.

Book Review

Concepts of Forest Entomology

by Kenneth Graham, Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y., 1963, 388 pp., $9.50.

Practical uses of theoretical information about the detrimental effects of insects in forests is offered in the lastest of Reinhold's biological books, *Concepts of Forest Entomology* by Kenneth Graham.

Long associated with forest management, both in industry and at the University of British Columbia, author Graham has assembled some 935 references which attempt to depart from the usual texts on forest entomology.

Placing emphasis on principles of entomology as related to forest management, rather than simple identification of trees and insects which attack them, *Concepts* takes an economic tack. Proper evaluation of damage will give indications of what trees can be saved for marketing, a chapter on economic evaluation shows.

Insects are not treated superficially; rather, in-depth discussion on the pest and the manner in which it damages trees, whether by boring, leaf mining, or root chewing, gives the student of forestry a sound basis upon which to determine causes of timber loss. A table is included which sets forth the principal insects found in forests and what part of trees they damage. This makes damage detective work simpler.

Ground-based and aerial application devices, formulas of commonly used pesticides, and various methods of treatment are part of the large chapter on applied control, and should be useful to any operator offering tree spraying, whether in a forest or not.

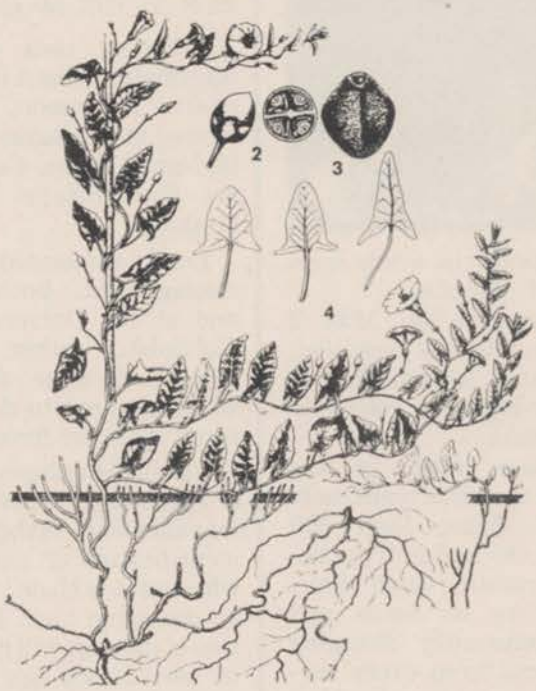
Although *Concepts* contains easily read, informative material, readers will slow their speed when presentations of mathmetical determinations for damage and loss analyses appear.

An academic work with a refreshing, practical slant that pinpoints the study of entomology in the scheme of forest management, *Concepts of Forest Entomology* will be useful to most outdoor spraymen.

Know Your Species

FIELD BINDWEED

(Convolvulus arvensis)



Field bindweed (sometimes called wild morning glory, creeping jenny, or European bindweed) is a deep-rooted perennial which reproduces by seed and buds from spreading roots. The Southeast, because of its climate, is the only portion of the U. S. not bothered by it.

Of all twining or vining weeds with morning glory type flowers (funnel-shaped) and arrow-shaped (saggitate) leaves, field bindweed can be most quickly identified by the flower size, being about 1 inch across, and the small bracts (scale-like leaves) found on the flower stalk ½ to 2 inches below the flowers. A characteristic which distinguishes field bindweed from hedge bindweed, *Convolvulus sepium*, is the leaf. Both are arrow-shaped but field bindweed's leaves are blunt at the tip; hedge bindweed's leaves are sharp-pointed and have large, square-shaped basal lobes. On all other "strangler weeds," leaves are either heart-shaped or flowers are much smaller or significantly larger than 1 inch in diameter.

Stems are slender, trailing (creeping on the ground), or twining, smooth (not hairy), and without tendrils. They may reach a length of 7 feet when uncontrolled.

Leaves (4) are alternate on stems, arrow-shaped with expanded basal "wings." They have long petioles.

Flowers (1) are white or pinkish, about 1 inch wide, funnel-shaped, and arise from axils of leaves (point where leaf meets stem). Seeds (2, 3) are about ⅛ inch long, ovoid, with one or two sides flattened. Their color varies from brown to dark gray. They may remain in the soil many years before sprouting.

Slender roots grow in all directions downward, sometimes to a depth of 20 feet or more. New shoots are produced from buds on the roots. After stems reach the five-leaf stage, cutting off tops will not destroy field bindweed, for at this point of development roots will only send up new shoots.

2,4-D in its various formulations is effective against field bindweed. Applications should be made when the plant is actively growing and in the well-developed vegetative or bud stages of growth. Applications of 2,4-D must be repeated to cause eradication.

Sodium chlorate, monuron, fenac, and 2,3,6-TBA are effective soil treatment herbicides.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

(DRAWINGS FROM NORTH CENTRAL REGIONAL PUBLICATION NO. 36, USDA EXTENSION SERVICE)

39th Shade Tree Conference Set for Aug. 4-9 in Toronto

Increasingly complex problems involved in preserving tree populations in North America will be the focal point of concern for delegates to the 39th Annual Convention of the International Shade Tree Conference, scheduled for August 4-9 in Toronto, Ontario, Canada.

More than 800 commercial arborists, contract applicators, city foresters, and park superintendents are expected to attend the five-day, fact-filled conclave. Center of activities will be the Royal York Hotel, in downtown Toronto.

Convention is being sponsored in association with the National Arborists Association. In addition to the panel discussions and information sessions, an extensive Trade Show is also planned.

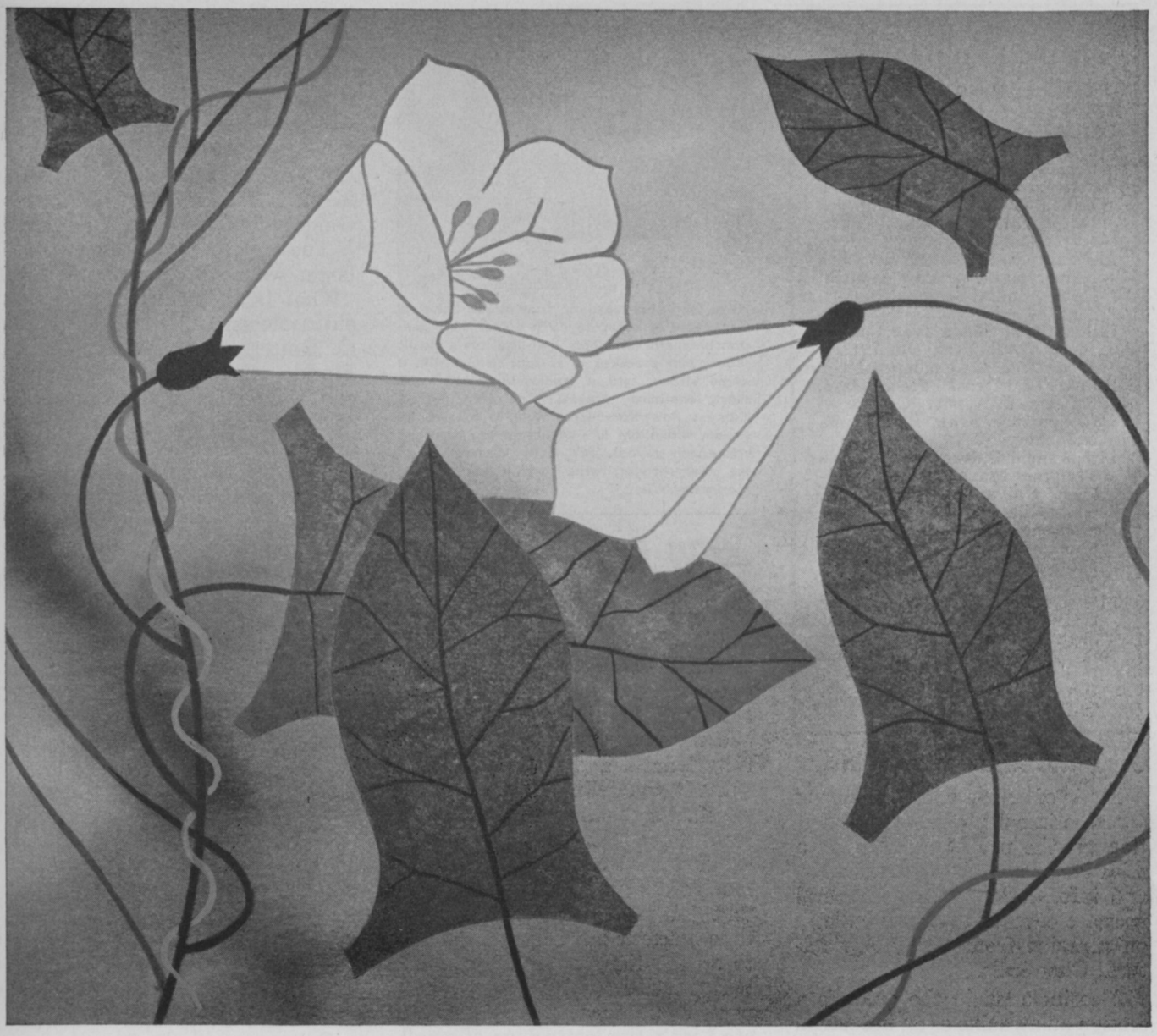
Registration opens Sunday afternoon, August 4th, and a reception for all delegates will be held that evening.

Monday's sessions will cover the relation between soil and tree growth, plus an examination of salt damage from snow removal programs. Panelists will also detail many common tree diseases, including birch dieback, maple decline, ash dieback, and sweet gum blight.

Various approaches to tree management will be outlined Tuesday. C. Elmer Lee, chairman of the Utility Arborists Committee, will explain his committee's operations; program of the National Arborists Association will be covered by Paul E. Tilford, executive secretary of that group; and John Michalko, chairman of the Municipal Arborists Committee, will survey the MAC's activities.

Business aspects, landscape design, professional arboriculture, and a resume of the facts on pesticide usage are also on the docket.

For more information on the conference, or advance registration forms, CAs should write Dr. L. C. Chadwick, Secretary-Treasurer, International Shade Tree Conference, Ohio State University, 1827 Neil Ave., Columbus 10, Ohio. For hotel reservations, delegates are urged to write directly to the Royal York Hotel.



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Meeting Dates

USDA Field Day for industrial cooperators. Plant Industry Station, Beltsville, Md., July 10.

American Assn. of Nurserymen Annual Convention, Shamrock Hilton Hotel, Houston, Texas, July 20-24.

Alabama Nurserymen / Southern Nurserymen Annual Convention, Hotel Admiral Semmes, Mobile, Aug. 4-6.

International Shade Tree Conference, Royal York Hotel, Toronto, Ontario, Canada, Aug 4-6.

Rutgers Turfgrass Field Days, Rutgers University College of Agriculture, New Brunswick, N.J., Aug. 7-9.

11th Annual University of Florida Turfgrass Management Conference, University of Florida, Gainesville, Aug. 27-29.

Nurserymen and Growers Annual Short Course, University of Florida, Gainesville, August 28-30.

Midwest Turf Field Day, Purdue University, Lafayette, Ind., Sept. 9 (repeated Sept. 10).

70th Annual Farm Equipment Institute Convention, Roosevelt Hotel, New Orleans, La., Sept. 29-Oct. 2.

Geigy Has Atrazine Bulletin

Mode of action and behavior of atrazine in soils, current information on the use of atrazine as a selective or nonselective herbicide, and information on experimental uses are covered in a new bulletin on atrazine from Geigy Agricultural Chemicals.

Also included in the guide is a section on atrazine as an industrial herbicide, and recommendations of other herbicides which may be combined with atrazine.

CAs who would like a free copy of the 16-page bulletin, No. GAC 700-20, should write to Geigy Agricultural Chemicals, P.O. Box 430, Yonkers, N.Y.

NCWC Conference on Microfilm

Proceedings of the North Central Weed Control Conference, from 1944 to 1954, are now available on microfilm from University Microfilms, Inc., 313 N. First St., Ann Arbor, Mich., according to G. C. Buskirk, secretary-treasurer of the NCWC.

Microfilms of the Research Reports from 1947 to 1954 are also available from the same firm, Buskirk notes.

New fiberglas sprayer from Ansul Chemical Co. is said to be up to 40% lighter than comparable metal containers. Self-lubricating plastic slide pump produces a 35-foot stream with a single stroke, and a continuous stream with short, one-third strokes. One-piece nozzle changes flow from wide-angle to long-range stream with slight turn of nozzle tip, company spokesmen reveal. For more information on the new sprayer, write Ansul Chemical Co., Marinette, Wis.

—W & T Mailbox—

W&T Aids Expansion

We operate a lawn-shrub-tree fertilizing service, and expect to expand, as we qualify, into insecticide and herbicide applications. We find your magazine wonderfully helpful and informative.

Do-it-yourselfing is always less satisfactory than professional services. The homeowner probably won't take the time to learn as much as he should, to do a competent job on his yard, and even then he can't have the equipment to do the job quickly and easily.

If service (with our trained personnel, knowledge, equipment, etc.) isn't the last refuge of small business, what is? Anyway, I'm counting on people being lazy.

James G. McClure

Fertilagitator Sales & Service
Vista, Calif.

Keep All Issues

I think you should be complimented on bringing out a fine publication for the weed and turf industry. It certainly satisfies a need.

Usually I skip through a magazine and may tear out something for filing or for forwarding to others. However, I now find myself currently wanting to keep the entire issue of *Weeds and Turf* for reference.

Harry L. Haynes

Union Carbide Consumer Products Co.
New York, N.Y.

Insects Theme of 11th Fla. Turf Management Confab, Aug. 27-29

Close scrutiny of the insect enemies of turf and ornamentals will mark the opening sessions of the 11th Annual Turf Management Conference, scheduled for Aug. 27-29 at the University of Florida, Gainesville.

Tuesday morning sessions will begin with an examination of "What Is an Insect?" by Florida entomologist G. W. Dekle. Dr. L. C. Kuitert, of the University of Florida's Department of Entomology, will explain the fundamentals of insect control, and extension agents Dr. Stratton H. Kerr and Dr. J. E. Brogdon will discuss specific pests of lawns and plants.

This part of the program will conclude with an evaluation of new approaches and trends in insect control, by Florida expert Dr. Carroll N. Smith.

"Industry Hour," Tuesday evening, is a new feature of the program. Representatives of firms marketing chemicals and fertilizer products for turf who exhibited at the Trade Show will be allowed five minutes each to discuss one or more of their products.

Professional discussion sessions on golf turf; play fields, parks, and cemeteries; retail dealers and garden supply centers; horticultural spraymen and lawn service agencies; and turf nurseries conclude the formal part of the program Wednesday.

Delegates will also tour the turf research facilities and experiment grounds at the University of Florida.

For more information on the conference, write to Walter D. Anderson, Executive Secretary, Florida Turf-Grass Assn., P.O. Box 5284, Jacksonville 7, Fla.

Chart Describes Thiodan Uses

All registered uses for Thiodan insectide have been included in a new guide from Niagara Chemical Division, FMC. Listed are more than 40 crops and ornamentals on which Thiodan can be applied to control a total of over 100 insect pests.

Copies of "Thiodan, the Grower Approved Insecticide" are available from Niagara Chemical Division, FMC Corp., Department A, Middleport, N.Y.

Eye-catching display of the Azo Chemical Co., Canton, Ohio, was built with less than $100 in materials, according to L. A. Smith, Azo's president. His wife, Mrs. Joan Smith, is shown with literature distributed at the recent Canton Home Show. Booth, which is on display at similar meetings, county fairs, and so on, is featured at the firm's office or warehouse when not in use. "Our display has given us more attention than any other advertising we've done," Smith is convinced.

Hercules Has No-Drift Sprayer

A new spray system, claimed to eliminate drift in commercial application of hormone-type herbicides, has been announced by the Hercules Powder Co., under the name Rhap-Trol system.

Rhap-Trol system deposits a mayonnaise-thick emulsion in a rigidly controlled area, even in winds up to 20 mph, company spokesmen claim. This placement of spray material thus makes for maximum economy of operations, the firm adds.

Contract applicators will be able to license the system from Hercules, for spreading weed- and brush-killing herbicides on rights-of-way along railroads, highways, power lines, and in areas adjacent to susceptible crops.

Spray applicators can be mounted on helicopters, airplanes, or truck booms, and a special handgun applicator has also been developed, according to Hercules. Material is sprayed in particles sized small enough to obtain desired coverage, and yet large enough to minimize drift, the manufacturer reports.

For more information on the new spray system, write Hercules Powder Co., Inc., Hercules Tower, 910 Market, Wilmington 99, Del.

Freeman Explains Federal Law To Pesticide Use Investigators

In his statement before the Senate Subcommittee on the control of pesticides and other chemical poisons, Secretary of Agriculture Orville Freeman described how present federal laws protect the public. He appeared as an expert witness at hearings of the Ribicoff committee formed after President Kennedy was given the report by his Science Advisory Committee on pesticides.

"Federal law requires scientific proof that a pesticide is safe before it can be sold across state lines," Freeman explained. "It also places definite restrictions on the use of pesticides in food production . . . This is how it works:

"A company seeking registration of a new pesticide applies to the Department of Agriculture for registration of its product. It must submit exhaustive data supporting its claim that the compound is safe and effective for specified purposes.

"This data is evaluated by Department scientists. They ask for more proof if they feel they need it.

"If evidence indicates that the proposed pesticide would leave a residue on food or feed crops, or in meat, the Department refers it to the Department of Health, Education, and Welfare's Food and Drug Administration, which is responsible for determining the level at which these residues are safe.

"The applicant company must then apply to FDA to set a tolerance — that is, the maximum safe amount of residue of the chemical that will be legally permitted to

Literature you'll want . . .

Here are the latest government, university and industrial publications of interest to contract applicators. Some can be obtained free of charge, while others are nominally priced. When ordering, include title and catalog number, if any. Sources follow booklet titles.

Controlling Insects and Diseases on Ornamental Trees, Bulletin E269, 1961, Agricultural Experiment Station, Michigan State University Bulletin Office, P.O. Box 231, East Lansing, Mich.

Weeds of the Northeast, Aids to Their Identification by Basal-Leaf Characteristics, Field Manual No. 1, University of Delaware, Agricultural Experiment Station, Newark, Del.

Torpedograss and Citrus Groves, Bulletin S-136, University of Florida Agricultural Experiment Station, Gainesville, Fla.

Lawn Care, 12 p. il., Bulletin 3-624, O. M. Scott & Sons Co., Marysville, Ohio.

Chlorosis of Trees and Shrubs, Bulletin BP-2-3, 1959, Agricultural Publications Office, Agricultural Experiment Station, Purdue University, Lafayette, Ind. 5¢

Ethylene Dibromide for Control of the European Chafer, Catalog No. ARS-33-71, 34 p., Agricultural Research Service, U.S. Department of Agriculture, Washington 25, D.C.

Russian Knapweed, Bulletin L-45, 1962, University of Wyoming, Agricultural Extension Service, Laramie, Wyo.

Control of Aquatic and Ditchbank Weeds, Bulletin X-158, University of California, Agricultural Experiment Station, Berkeley 4, Calif.

Pest Control Program for Home Orchards and Small Fruit, Folder F-17, 1961, Agricultural Experiment Station, Michigan State University Bulletin Office, P.O. Box 231, East Lansing, Mich.

Guide to More Beautiful Lawns and Gardens, 24 p. il., Armour Agricultural Chemical Co., Atlanta, Ga.

Lawn Insects and How to Control Them, Home & Garden Bulletin No. 53, Office of Information, U.S. Department of Agriculture, Washington 25, D.C.

Fungicides for Shade Trees, Bulletin BP-2-11, Agricultural Publications Office, Agricultural Experiment Station, Purdue University, Lafayette, Ind. 5¢

Soil Testing, Bulletin 239, University of Florida Agricultural Experiment Station, Gainesville, Fla.

Some Grasses of the Northeast, A Key to Their Identification by Vegetative Characteristics, Field Manual No. 2, Agricultural Experiment Station, University of Delaware, Newark, Del.

Oak Wilt, Bulletin BP-2-6, Agricultural Publications Office, Agricultural Experiment Station, Purdue University, Lafayette, Ind. 5¢

remain in or on food products in interstate commerce. Normally, an FDA tolerance is set at 1/100th of the amount found safe in the most susceptible test animals.

"If the manufacturer proves that his product meets the tolerance requirements, and if he convinces the Department of Agriculture that it is safe and serves a useful purpose — then we are ready to grant registration.

"Before registration is granted, however, the manufacturer must obtain the Department's approval of the label to be used on the product. The requirements for labeling are rigid and comprehensive. Labels must clearly state what the product is, what it is made of, what it can be used for, what its dangers are, what safety precautions must be observed in using it, and the name and address of the responsible company.

"The Department follows through by spot-checking pesticides offered for sale at wholesale and retail levels, to determine they are properly registered and that labeling requirements are in fact being met."

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These specialty products, developed specifically for golf course and park use, are now available for the treatment and control of fine turf grasses. VICHEM research in agricultural chemicals has produced such outstanding developments as DSMA—DiSodium Methyl Arsonate; AMA—Ammonium Methyl Arsonate; CPA—Calcium Propyl Arsonate; CALAR— Calcium Acid Methyl Arsonate.

. . . the finest chemicals to protect your finest turf.

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LIQUIPHENE 10% & 33⅓% (PMA)
THIURAM 75 (Thiram 75%)
VI-CAD (Cadmium Chloride)
THIURAM M (Thiram-Mercury)

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CRAB-E-RAD (Powder) DSMA
SUPER CRAB-E-RAD (Liquid) AMA
SUPER CRAB-E-RAD + 2 (Liquid) AMA + 2,4,D
SUPER CRAB-E-RAD (Calar)
CRAB-E-RAD 30 (Liquid) DSMA

• for Dallis grass control
DAL-E-RAD 100 (Powder) DSMA
SUPER DAL-E-RAD (Liquid) AMA
SUPER DAL-E-RAD + 2 (Liquid) AMA + 2,4,D
DAL-E-RAD 30 (Liquid) DSMA

Distributor Inquiries Invited

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Trimmings

New crop coming up. In May this column included an item about the need for educated personnel for the outdoor spraying industry, and we've been musing about the fact that each June brings a whole new crop of horticulturists into our field. With this thought in mind, we were pleased to have a note recently from George D. Newell, a college student from Columbia, Mo., who does contract maintenance in the summers, and who is planning to open a complete garden center upon graduation. George has some kind things to say about *W&T*, and we hope he'll keep us informed of his progress after he leaves the campus.

* * *

Tree service branches out. **We frequently comment on the obvious trend today of rounding out the services of companies which participate in one facet or another of vegetation management. Turf people get into weed control; brush control companies eye turf fertilization; tree "surgeons" go after lawn insects. This is as it should be, we believe, because it is really one industry with a variety of services to be offered. As a further example of our conviction, we offer comments from E. L. Parker, who runs Parker Tree Service in Peterborough, N.H. Mr. Parker writes that his tree service company has been doing brush control for years, but only recently has he considered weed control work. Mr. Parker also offers tree fertilization, and this has led him, he writes, to an interest in turf work, too. No doubt opportunities abound in the highly cultivated New Hampshire countryside, with its lawn-conscious New England towns!**

* * *

Grace grows grass. Anyone who thinks contract lawn service is a minor industry will probably change his mind when he learns that no less a company than W. R. Grace has entered the contract lawn maintenance business. Operating from Grace's Davison Chemical Division, the new consumer-oriented marketing approach is said to enlist local oil dealers as Davison Division applicators. Through Grace's new service, according to an article in *Chemical Week* for April 27, consumers may choose any part, or all, of a three-stage program which includes application of crabgrass, insecticide, and fertilizer chemicals. Apparently this new entry into lawn service competition is still in its test-market stage, but it's a good indication to CAs everywhere just how important this industry is!

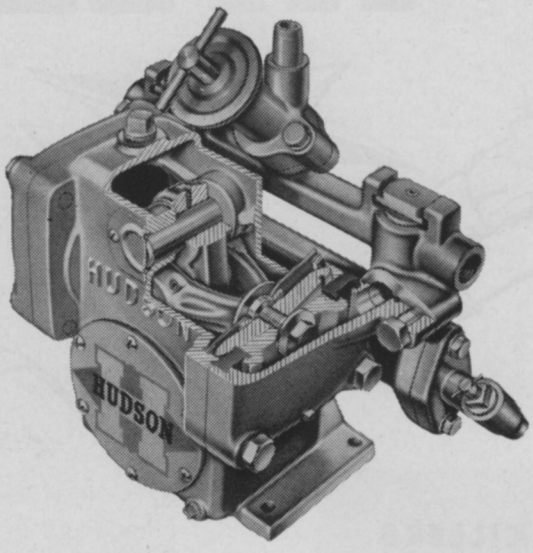
* * *

More from the East. **Another Easterner who has written us is Anthony R. Quatrone, of Antone Landscape Co. in Union, N.J. Tony says his "grounds maintenance" firm applies selective and nonselective weedkillers on parking lots, driveways, fences, and lawn areas, and that he has 50 residential and industrial accounts which range in size from 50 x 100 ft. to 20 acres! Obviously no piker, Mr. Quatrone is no doubt kept very busy by this formidable array of contracts, and we're very pleased he took time to write us!**

* * *

DC sparks CAs. Speaking of business-building, livewire applicators are quick to realize that all the Washington hoopla about pesticide hazards is just one more good selling point to convince customers of the need for skilled, *professional* applicators!

No gears.
No sliding pistons.
No connecting rods.
No packing, no cups.
No greasing or oiling.
No exposed working parts.



Almost nothing to wear, break or chip in the New Hudson **TEN-O-MATIC*** *sprayer pump*

Would you like to have a power sprayer that's ready to spray—without delay—whenever you are?

With a pump built to cut time-wasting stops for service, repairs?

Get all this *now* in a Peerless* sprayer with TEN-O-MATIC pump.

Best of all, you'll like what you don't get—trouble. No unneeded, wearing parts. No extra weight or size.

Store your grease gun and oil can. You won't need them. The TEN-O-MATIC pump transmission operates in a complete oil bath—like your car. You change oil only every 100 hours.

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And tanks come with stainless steel or ENDURALL* liners.

How about pump efficiency? You can hold constant volume at any pressure up to 400 lbs *without drop off from slippage or leakage.*

Output? Up to 10 gallons a minute—enough for 2 double-nozzle guns.

Ask your dealer to get you more information about Peerless sprayers with TEN-O-MATIC pumps. Or write us.

Peerless, with TEN-O-MATIC, in 150, 200, 300-gal sizes. Others, 10-300 gallons, 1½-5 gpm pumps.

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For control of woody and herbaceous plants such as alder, aspen, bick, chokeberry, elder elderberry, elm hickory, locust, poison ivy, poison oak, sumac with cherry, wild grape, willow and many, many other species.

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No. 50A WEED KILLER

Here's the easiest and most economical method to kill all vegetation! Excellent for driveways, tennis courts, storage tank areas! Distinctive coal tar odor!

Amine Types

Baird's Amine type weed and brush killers feature:

- Non-Volatile
- Rapid Penetration
- Less Harmful to Grasses
- Work in Hard or Soft Water
- Complete Control with Minimum Application

4 D AMINE WEED KILLER

Here's a product packed with "kill-punch"! Excellent for pre-emergence control. Kills dandelion, poison ivy, poison oak, ragweed, plantain, thistles, docks and many other broadleaved weeds without injury to grasses . . . fortified with wetting and sequestering agents . . .

PEST CONTROL Operators have no trouble solving customer's weed and brush killing problems when they use tested formulations from Baird and McGuire . . . because this manufacturer offers PCO's Quality Products, Fast Service, Years of Research Experience and products *Priced for Profits!*

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